

CLAIMS:

1. A transmission network for communicating information at directional radio frequencies, said network comprising:

5 a broadband network servicing a first area, and including a plurality of first and second transmitters, the direction of transmission of each first and second transmitter lying substantially parallel to a first geographical axis, and

10 a broadcast network servicing a second area substantially overlaying the first area, and including a plurality of third and fourth transmitters, the direction of transmission of each third and fourth transmitter lying substantially parallel to a second geographical axis, the second axis being orthogonal to the first axis,

15 wherein the broadband network transmits in a first frequency band, and the broadcast network transmits in a second frequency band, the first frequency band being substantially the same as the second frequency band.

2. A transmission network for communicating information at directional radio frequencies, said network comprising:

(a) a plurality of first, second, third and fourth cells, each first, second, third and fourth cell comprising:

20 a first transmitter for transmitting radio frequency information in a first direction to define a first reception footprint substantially within the cell, the first transmitter being disposed at or adjacent a periphery of the cell, and

25 a second transmitter for transmitting radio frequency information in a second direction substantially opposed to the first direction to define a second reception footprint substantially overlapping the first reception footprint, the second transmitter being disposed at or adjacent the periphery of the cell at a position substantially opposed to the first transmitter,

30 the first, second, third and fourth cells being generally circular or oval in plan, of similar size and transmitting at first, second, third and fourth frequencies respectively, the first transmitter of each first cell being disposed at or adjacent the second transmitter of an adjacent second cell, and the first transmitter of each third cell being disposed adjacent the second transmitter of an adjacent fourth cell,

the plurality of cells being arranged such that the first and second directions, in which the first and second transmitters respectively transmit, are parallel;

(b) a first rectangular array of the first and second cells, the periphery of each first and second cell abutting the peripheries of respective surrounding first and second cells, wherein rows of the first rectangular array in a direction parallel to the first and second directions comprise alternating first and second cells, and each of the rows of the first rectangular array orthogonal to the first and second directions includes either first or second cells, and

(c) a second rectangular array of the third and fourth cells, the periphery of each third and fourth cell abutting the peripheries of respective surrounding third and fourth cells, wherein rows of the second rectangular array in a direction parallel to the first and second directions comprise alternating third and fourth cells, and each of the rows of the second rectangular array orthogonal to the first and second directions includes either third or fourth cells,

wherein the cells of the second rectangular array are displaced with respect to the cells of the first rectangular array by approximately the radius of a cell in the first direction, and by approximately the radius of a cell in a direction orthogonal to the first direction.

3. A transmission network according to claim 2, wherein the first, second, third and fourth frequencies are generated by horizontal and vertical polarisation of a first frequency and a second frequency.

4. A transmission network according to ^{claim 2} ~~claims 2 to 3~~, wherein the network is a broadband, two way network, in which return signals are transmitted from one or more points within the cell.

5. A transmission network according to claim 4, wherein the return signals are transmitted at a frequency other than the first, second, third or fourth frequencies.

6. A transmission network according to ^{claim 2} ~~any one of claims 2 to 5~~, further including a broadcasting network for one-way broadcasting of information.

7. A transmission network according to claim 6, wherein the broadcasting network includes a plurality of fifth cells and sixth cells, wherein:

each fifth cell includes a fifth transmitter for transmitting radio frequency information in a third direction orthogonal to the first and second directions to define a reception footprint substantially within the fifth cell, the fifth transmitter being disposed at or adjacent a periphery of the fifth cell; and

each sixth cell includes a sixth transmitter for transmitting radio frequency information in a fourth direction substantially opposite the third direction to define a reception footprint substantially within the sixth cell, the sixth transmitter being disposed at or adjacent a periphery of the sixth cell.

8. A transmission network according to claim 7, wherein the fifth transmitter of each fifth cell is disposed at or adjacent the sixth transmitter of an adjacent sixth cell.

9. A transmission network according to claim 8, including:

a third rectangular array of the fifth and sixth cells, the periphery of each fifth and sixth cell abutting the peripheries of respective surrounding fifth and sixth cells, wherein rows of the third rectangular array in a direction parallel to the third and fourth directions comprise alternating fifth and sixth cells, and each row of the fourth rectangular array parallel to the first and second directions includes either fifth or sixth cells;

a fourth rectangular array of the fifth and sixth cells, the periphery of each fifth and sixth cell abutting the peripheries of respective surrounding fifth and sixth cells, wherein rows of the fourth rectangular array in a direction parallel to the third and fourth directions comprise alternating fifth and sixth cells, and each row of the fifth rectangular array parallel to the first and second directions includes either fifth or sixth cells;

wherein the cells of the fourth rectangular array are displaced with respect to the cells of the third rectangular array by approximately the radius of a cell in the third direction, and by approximately the radius of a cell in the first direction.

10. A transmission network according to claim 9, wherein the cells of the third rectangular array are displaced with respect to the cells of the first rectangular array by approximately the radius of a cell in the first direction.

11. A transmission network according to claim 9 ~~or 10~~, wherein the broadcasting network is an analog network utilising frequency modulation.

12. A transmission network according to claim 11, wherein cells within the third rectangular array are half channel interleaved with cells from the fourth rectangular array

13. A transmission network according to claim 9 or 10, wherein the broadcasting network utilises a digital modulation scheme.

14. A transmission network according to claim 13, wherein the digital modulation scheme is quadrature phase shift keyed modulation.

15. A transmission network according to any one of claims 7 to 14, wherein the information to be broadcast via the broadcasting network is relayed between cells thereof by means of directional receivers and transmitters.

16. A transmission network according to claim 15, wherein the information to be broadcast is relayed at frequencies similar to those used by the broadcasting network.

17. A transmission network according to any one of claims 2 to 16, wherein the first, second, third and fourth cells are grouped into clusters, each cluster being connected to a broadband backbone through a single connection point.

18. A transmission network according to claim 17, wherein the cells within each cluster relay information to and from the connection point by means of directional radio frequency transmissions between adjacent cells within the cluster.

19. A transmission network according to claim 18, wherein the directional radio frequency transmissions are relayed at frequencies similar to those used by the broadcasting network.

20. A transmission network according to any one of the preceding claims, further including infill cells for covering particular areas within the transmission network not covered by any of the first, second, third or fourth cells, or by the broadcasting network.

5 21. A transmission network as claimed in claim 1, wherein the broadcast network is used for one-way broadcasting of information.

22. A transmission network as claimed in claim 1, wherein the broadband network is a two-way network.

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23. A transmission network as claimed in claim 1, wherein the first and second transmitters are grouped into clusters, each cluster being connected to a broadband backbone through a single connection point.

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24. A transmission network as claimed in claim 1, wherein the first and second transmitters transmit at any one of a first, second, third or fourth frequency, the first, second, third and fourth frequencies being generated by horizontal and vertical polarisation of a first frequency and a second frequency.